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AUTHOR Detlor, Brian
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ABSTRACT

This paper explores the viability of a new approach to intranet design, one that is based on an understanding of the organizational information environment and user information behavior. The approach was used by 11 project teams of graduate students to develop intranet designs for local organizations. The workbooks used by the project teams were analyzed to identify the components of the approach that were more frequently utilized in the creation of value-added processes. Suggestions for future avenues are offered based on the findings of the study. (Author)

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Basing Intranet Design on the Organizational Information Environment and User Information Behaviour

Brian Detlor
Faculty of Information Studies
University of Toronto
detlor@fis.utoronto.ca

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Abstract

This paper explores the viability of a new approach to intranet design, one that is based on an understanding of the organizational information environment and user information behaviour. The approach was used by 11 project teams of graduate students to develop intranet designs for local organizations. The workbooks used by the project teams were analysed to identify the components of the approach that were more frequently utilized in the creation of value-added processes. Suggestions for future avenues of research are offered based on the findings of the study.

Résumé

Cet article explore la viabilité d'une nouvelle approche de développement d'intranet. Il s'agit d'une approche basée sur la compréhension de l'environnement informationnel de l'organisation et sur le comportement informationnel de l'usager. L'approche a été utilisée par 11 groupes d'étudiants gradués dans le développement de modèles d'intranet pour des organisations régionales. Les carnets de travail utilisés par les groupes de projet ont été analysés afin d'identifier les composantes de l'approche qui ont été le plus fréquemment employés dans la création des processus de valeur-ajoutée. Sur la base des résultats de l'étude, nous suggérons quelques avenues de recherche future.

Introduction

As the dawn of the millennium approaches, more corporations are implementing "internally focused internets" called intranets to promote the gathering, sharing, and dissemination of information throughout the enterprise. Organizations tend to center requirements for intranet design around information content and technology concerns. These may be insufficient to deliver intranet systems which support the context in which employees carry out necessary and diverse information seeking and use practices. This paper investigates and reports initial research results for a different approach to the design of intranets, one based on an understanding of the organizational information environment and user information behaviour.

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This design approach, based on Taylor's (1986) value-added model for information systems, as well as supporting evidence from various models of organizational information environments (Davenport 1997; Katzer and Fletcher 1992; Rosenbaum 1996; Taylor 1991), recognizes that the information environment and user information behaviour are often overlooked components in the systems development process.

Taylor's (1986) model argues the need for an analysis of the information environment of users as major input into systems design and places emphasis on looking "at the *user and the uses of information*, and the contexts within which those users make choices about what information is useful to them at particular times" (Taylor 1991, 218). Taylor emphasizes the need to describe and understand the environments from which problems arise and which require information for resolution. This has implications for intranet design as an analysis of the information environment can help encourage the development of value-added processes within an intranet that are more responsive to a wider variety of user problems and information behaviours.

Taylor (1991, 221) describes four categories of the information use environment (IUE), namely: sets of people, their problems, typical settings, and problem resolutions. Here, problems have certain characteristics, beyond specific subject matter, called problem dimensions, "that establish the criteria for judging the relevance of information to a problem or to a class of problems" (MacMullin and Taylor 1984, 103; Taylor 1986, 42). According to Taylor, this criteria can be used to assess the usefulness of information to a user's situation. Furthermore, problem resolutions consist of two components: first, the way sets of people typically use information to solve their problems; and second, a concern over how information should be packaged and displayed to help people discover resolutions to their problems. Such information traits are "the special attributes that can be used to define the ways that information can be identified and presented. More importantly, these traits can be related directly to the dimensions of a problem" (MacMullin and Taylor 1984, 98).

Katzer and Fletcher (1992) extend Taylor's model in the formulation of a model based on the characteristics of Taylor's IUE, namely people (i.e. managers), their organizational settings, their typical problems, and their range of acceptable resolutions. Central to the model is the notion that managers are confronted with problematic situations, which are modified and resolved over time through a series of information behaviours. Katzer and Fletcher demonstrate how problematic situations provide a mechanism by which the organizational environment can influence information behaviour.

Rosenbaum (1996; 1993) further extends this discussion by clarifying the relationship between the IUE and information behaviour. In Rosenbaum's framework, the IUE is structural in nature and composed of rules, resources, problems, and problem resolutions. Information behaviours are depicted as action-oriented, existing outside of the structure of the IUE. Further, there is a bi-directionality in the relationship between the IUE and information behaviours as each is shown to influence the other: "the presence of each makes the other possible; neither has meaning without the other" (1996, 112).

Davenport (1997) underlines the need to understand information environments and the way people use information at work. He suggests a new, holistic approach, called information ecology, placing emphasis on "*how* people create, distribute, understand, and use information" (1997, 5). According to Davenport, the information environment is at "the core of an ecological management approach, encompassing the six most critical components of information ecology—strategy, politics, behaviour/culture, staff, processes, and architecture" (1997, 34). Davenport in his detailed description of the components of the information environment brings awareness to the importance of user information behaviour and offers insight into the rich and complex context in which users work. He stresses that these must be taken into consideration when information systems are designed.

Towards a New Approach for Intranet Design

These models of information environments illustrate a steady progression in the understanding of this important construct. MacMullin and Taylor's (1984) initial call for the need to match user problem dimensions with proper information traits is amplified by Taylor's (1991) and Katzer and Fletcher's (1992) description of the structure of user information environments. Likewise, Rosenbaum's work helps clarify the relationship between information behaviour and the environment itself. Davenport's (1997) model broadens this further by acknowledging the complexity of the information environment and the influence organizational factors have in shaping its structure.

Borrowing from these works, a new approach is presented for intranet design, one which takes into consideration the structure of the information environment and its relationship to user information behaviours. The approach is composed of four iterative steps (see Table 1). The *first* identifies the need to situate design in the organization's information ecology. Here, developers attempt to design intranets that match the information culture and strategy of the organization. The *second* calls for a central focus on problematic situations through identification of problem dimensions typically experienced by major sets of users. The *third* stresses the need to focus on user information behaviour. Emphasis is placed on understanding typical problem resolutions, such as the information sources used by employees and the information traits they are more likely to value to help solve their problems. The *fourth* brings together elements of the other steps by constructing value-added processes in the intranet design which produce outputs that signal the potential value of information to users and match the overall information ecology, problematic situations, and information behaviours exhibited by organizational participants.

To test the effectiveness of this approach, project teams used these steps to develop intranet designs for local organizations. The designs were analysed in terms of their ability to match the organization's information environment and information behaviours of users. This analysis served to answer two broad research questions. The *first* dealt with the viability of the approach in creating intranet designs that matched the information context and behaviour of organizational participants. The *second* dealt with identifying the components of the approach that were more frequently utilized in the creation of value-added processes.

Table 1: A Tentative Approach To Intranet Design

Step	Description
1)	Understand the organization's **information ecology**.
2)	Identify the typical **problems** and associated *problem dimensions* experienced by *major sets of users*.
3)	Understand user **information behaviour** by concentrating on typical *problem resolutions* in terms of the *information sources* used and the *information traits* more likely valued.
4)	Create **value-added processes** in the intranet system that match the information ecology and help users resolve their typical problems.

Methodology

The project teams comprised 31 graduate students of a one-semester intranet design course. Each project team consisted of two or three members. The author was invited to speak at one class to explain the steps of the design approach and the use of a project workbook.

The first section of the workbook dealt with *information ecology*. This section asked team members to describe the organization's mission statement, physical setting, intranet goals, and the six ecological components identified by Davenport (1997): information strategy, information politics, information culture, information staff, information processes, and information architecture.

The second section of the workbook dealt with *information behaviours*. It asked project members to identify major sets of users for the intranet and to discuss their typical work-related problems and tasks, specifically their problem dimensions and their problem resolutions in terms of information sources, information uses, and information traits. To do this, project members rated each problem according to the 11 dichotomous categories of problem dimensions identified by MacMullin and Taylor (1984) and each information source typically used to resolve these problems in terms of MacMullin and Taylor's (1984) nine continuums of information traits and Taylor's (1991) eight classes of information use.

The third section of the workbook dealt with *functional design*. Team members were asked to include an intranet site map, a print-out of the intranet's entry page, a print-out of one of the intranet's second-level pages, and a description of one partially-implemented functional feature.

The last section of the workbook dealt with *value-added processes*. This section asked project members to describe the major value-added processes offered by the intranet design that helped users resolve their typical problems and that fit or improved the organizational information ecology. Specifically, team members were asked to describe how the value-added processes addressed the information ecology, problem dimensions, and information traits identified in the earlier sections of the workbook.

In total, 11 intranet designs were developed using the approach. Each team's workbook was collected and analysed by the author. An Excel spreadsheet was created to help identify trends and patterns across the various designs. Rows of the spreadsheet corresponded to individual projects; columns corresponded to the various categories and questions of the workbook itself. To investigate the degree to which the approach aided team members in creating their intranet designs, the teams' descriptions of how each of their value-added processes helped people solve their problems and helped fit the information ecology were coded using the nine information ecology components, 11 problem dimension dichotomies, and nine information trait continuums discussed above as coding categories. Condensing the contents of the project workbooks in this way enabled the author to analyse and compare workbook categories across all projects.

Results

The organizations studied varied considerably between project teams. Some were large organizations with global operations; others were much smaller with all organizational participants inhabiting the same physical location. On average, the project teams identified two or three major sets of users. For each of these sets, one or two significant information problems were described, as well as one or two information sources typically used to help resolve each problem. Almost half of the organizational participants were identified as using these information sources predominantly for instrumental reasons, that is, to find out what to do or how to do something.

In terms of information ecology, most project teams deemed the purpose of the intranet was to support the organization's mission statement and, more specifically, to improve information access, sharing, and use throughout the enterprise. Most viewed intranets as a medium by which to foster group collaboration, knowledge creation, and organizational communication. Of the organizations studied, 54.5% had no formal information management plans. All teams indicated an aspiration towards a federalistic approach to managing information through shared consensus and negotiation, though 45.5% stated that a feudalistic approach was most representative where individual departments managed their own information needs. Interestingly, 36.4% of teams indicated that anarchy prevailed to some extent in terms of the information politics of the organization.

Though the organizations varied greatly in terms of their structure and size, most project teams (i.e. over 90%) reported that the physical setting restricted access to information in the organizations that were studied. In terms of information culture, 54.5% of the teams indicated that even though the organizations strived to value and share information, the prevailing information culture was typically characterized by either information hoarding and/or information overload. Roughly one third had no formal information staff available to organizational participants to help manage the information assets of the enterprise or act as information intermediaries. The information processes of the organizations studied were considerably varied. In terms of information architecture, half of the organizations had some sort of information mapping tool or guide available to help organizational participants understand the location of information in the company.

In total, 42 value-added processes were created and described in the workbooks. Though these value-added processes varied across designs, the two most commonly implemented were *discussion areas*, which provided a forum for organizational participants to communicate and share interpretations, and *knowledge repositories*, which allowed organizational participants to access databases containing items such as best practices, frequently-asked questions, meeting minutes, task force updates, case studies, and company profiles. Less commonly implemented value-added processes were ones that provided access to corporate documents such as staff directories and company policies.

For each value-added process, project teams identified the components of the approach used in the formulation of value-added processes. Tables 2, 3, and 4 provide a summary of the information ecology, problem dimension, and information trait components utilized in the creation of value-added processes in the intranet designs.

Table 2: Frequency of Information Ecology Components Used in the Creation of Value-Added Processes

Rank	Component	Number of value-added processes created that used this component	Percentage of value-added processes created that used this component (N=42)
1	Physical Setting	25	59.5%
2	Information Culture	18	42.3%
3	Information Politics	11	26.2%
4	Information Strategy	5	11.9%
5	Organizational Mission	4	9.5%
6/7	Information Staff	3	7.1%
6/7	Information Processes	3	7.1%
8	Information Architecture	2	4.8%
9	Intranet Goals	0	0.0%

Table 3: Frequency of Problem Dimension Components Used in the Creation of Value-Added Processes

Rank	Component	Number of value-added processes created that used this component	Percentage of value-added processes created that used this component (N=42)
1	Design/Discovery	9	21.4%
2/3/4	Well/Ill Structured	4	9.5%
2/3/4	Complex/Simple	4	9.5%
2/3/4	Specific/Amorphous Goals	4	9.5%
5/6	Initial State Understood/Not Understood	3	7.1%
5/6	Familiar/New Pattern	3	7.1%
7	Internal/External Imposition	2	4.8%
8/9/10	Assumptions Agreed Upon/Not Agreed Upon	1	2.4%
8/9/10	Assumptions Explicit/ Not Explicit	1	2.4%
8/9/10	Susceptible/Not Susceptible to Empirical Analysis	1	2.4%
11	Magnitude of Risk Great/Not Great	0	0.0%

Table 4: Frequency of Information Trait Components Used in the Creation of Value-Added Processes

Rank	Component	Number of value-added processes created that used this component	Percentage of value-added processes created that used this component (N=42)
1	Historical/Forecasting	13	31.0%
2	Factual/Diffuse	12	28.6%
3/4	Quantitative/Qualitative	7	16.7%
3/4	Clinical/Aggregated	7	16.7%
5	Applied/Theoretical	5	11.9%
6/7	Hard/Soft Data	4	9.5%
6/7	Operational/Descriptive	4	9.5%
8/9	Single/Multiple Solutions	1	2.4%
8/9	Casual/Diagnostic	1	2.4%

Discussion

The design approach presented in this paper seems viable to the extent that it led to the development of feasible intranet designs. The designs produced by the project teams offered practical solutions through the creation of value-added processes which provide information in ways that help organizational participants resolve their typical problems. One project team indicated that the organization they studied had implemented their intranet design in practice.

In terms of the components of the approach more frequently utilized, most team members had little difficulty turning knowledge of the organization's information ecology, typical problems, information sources, and information uses into ideas for value-added processes. In fact, most members used these components reasonably well. However, the low frequency counts of problem dimensions and information traits used in the creation of value-added processes suggest that project teams experienced difficulty utilizing these lower-level components to devise value-added processes. The reason for this may not necessarily reflect the potential utility of problem dimensions and information traits but rather a lack of understanding of these constructs by team members. Despite this low usage, the analysis of the workbook descriptions showed evidence of problem dimensions and information traits as beneficial in terms of helping team members gain clarity on the nature of the typical problems faced and the information behaviours exhibited by organizational participants.

Though many useful value-added processes were created by the project teams, the approach did not prevent the inclusion of processes that did not address the typical problems faced or information behaviours exhibited by major sets of users. For instance, some project members imposed design solutions that appeared to them as being useful, despite the fact that these solutions did not meet an expressed or observed information need of the people being studied. It should be noted that such unwarranted functionality comprised only a small minority of the processes created.

Another observation was that the approach led to the development of technical solutions only. All project teams devised value-added processes in their intranet designs; none developed

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recommendations for management to remove organizational barriers that deter or prevent information overload and information sharing. In this respect, project members suffered from technocratic utopianism, a term which describes the underlying assumption of technology's ability to solve all problems of information governance (Davenport 1997, 77). Most project teams were idealistic towards the potential benefits of their technological solutions. The creation of value-added processes may be better served to include recommendations for social incentives which encourage organizational participants to use intranets in ways they were intended. Doing so may facilitate intranet adoption and use.

Another key learning of this study was the need for refinement of the fourth step of the design approach. Currently this last step describes the need to create value-added processes in the intranet design that match the information ecology of the organization. This may be better expressed as the need to enhance or support a good information ecology. In this sense, a good information ecology is defined as one which encourages information sharing, facilitates information access, prevents information overload, and promotes information management through shared consensus and negotiation. Though most organizations studied by the project teams aspired to these ideals, few experienced such environments in practice. In response, the fourth step of the approach may be better refined as the need to produce value-added processes which improve the information ecology of the organization, rather than as ones which match or extenuate existing information ecological environments.

Limitations of the Study

In terms of limitations, the lack of systems design experience by members of the design teams was probably an influencing factor in the quality of designs produced. The inclusion of more experienced designers in the study likely would have led to the development of different types of value-added processes or the use of different components of the approach. Another limitation was the lack of familiarity with the approach by the design team members. Only one class was dedicated to an explanation of the approach and use of the workbooks, though students were invited to read an on-line paper written by the author which discussed these in more detail.

Conclusion

This study provides initial support for the viability of a new approach to intranet design, one based on an understanding of the organizational information environment and user information behaviour. However, more empirical research is needed to substantiate the effectiveness of the approach and the utility of its components used in the creation of value-added processes.

Broadly speaking, there are two main avenues of future research direction. The first is to embark on similar studies, where the steps of the approach are used to create intranet designs for organizations. The effectiveness of the approach can be determined not only by the quality of the designs produced, but also through interviews and observations of organizational participants using the devised intranet designs in practice.

The second, and one in which the author plans to engage, is to conduct intranet evaluations. The idea is to evaluate existing intranets in organizations which are utilized by various sets of users to determine the need for intranets to match the information environment and information behaviours of organizational participants. Such research can be used to examine the relationship between intranet usage, in terms of both the frequency and information content used, and the extent to which an intranet matches the information needs and uses of organizational participants. It can also serve to gain insight on the relationship between intranet usage and the organizational context in which work is situated.

There is a need for such research. The goal is help organizations develop intranets that support user information needs and the contexts of work practice. Doing so, may encourage the creation of intranet designs in organizations that take them beyond the year 2000.

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